SONY

MPEG IMX Family 2005/2006

MPEG imx

www.sonybiz.net/imx

Digital Production for the Networked World.

■ An introduction to MPEG IMX

It has never been more important to increase the efficiency of programme production. But for broadcast productions, improving efficiency alone is not enough. Programme quality must be maintained and the challenge of distributing content across multiple delivery platforms must also be met. Choosing production systems which meet business needs today, and future-proof an operation for business tomorrow, is a critical decision for everyone.

MPEG IMX camcorders, studio recorders and players have been designed from the ground up to meet these demands. Building on over 25 years of Sony design experience, MPEG IMX is already meeting the needs of broadcasters and production facilities around the world. Users have entrusted the production of sports, drama, arts, commercials, news and natural history programmes to MPEG IMX, as well as distribution and long-term archive of content.

MPEG IMX provides the combination of excellent picture and sound quality, class-leading editing performance and rugged reliability which is mandatory for today's operations. And, to guarantee continued revenue from existing tape libraries, MPEG IMX recorders and players provide compatible replay of Betacam, Betacam SP, Betacam SX, MPEG IMX and Digital Betacam cassettes. The line-up of MPEG IMX products continues to evolve, with Sony now packing the latest technology into a second generation MPEG IMX camcorder. New features have also been added to the revolutionary e-VTR – a fully networked MPEG IMX recorder with IP connectivity. Incorporating the latest advances in file transfer and metadata, e-VTR elegantly integrates AV and IT operation and opens up the possibilities for collaborative content production within networked workgroups.

From standalone MPEG IMX camcorders and studio recorders, to fully networked production systems for broadcasting, MPEG IMX provides the ideal platform for the digital-networked era.

For more information, please visit the MPEG IMX website:

www.sonybiz.net/imx

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● Technology built on open standards

MPEG IMX

MPEG IMX incorporates the latest advances in production technology and is designed to fully meet recognised industry standards. Technologies are only incorporated where they provide demonstrable new benefits to the end user. Some of the latest technologies to be incorporated into the MPEG IMX system are explained here.

Longest-Ever Recording Times

MPEG IMX provides the longest-ever long recording time on a ½-inch Betacam-family cassette. A maximum of 220 minutes can be stored on a large cassette and 71 minutes on a small cassette when recording in 625/50 mode.

Lossless Transfer of MPEG-2 Data

The Serial Data Transport Interface – Content Package (SDTI-CP) is another SMPTE standard employed within MPEG IMX. SDTI-CP is an interface that transports the D-10 MPEG IMX data from one device to another. It transfers the data in its native D-10 form, guaranteeing a perfect data copy from one D-10 device to the next. MPEG IMX studio recorders use SDTI-CP to transfer video and audio from MPEG IMX cassettes at up to twice normal speed to D-10-compliant disk recorders and servers.

Broadcast Quality Pictures with D-10 Operation

The Society of Motion Picture and Television Engineers (SMPTE) has issued two standards on which MPEG IMX is based. These standards, known as D-10, were issued to ensure seamless operation between products from multiple manufacturers.

The first D-10 standard, SMPTE 356M, describes an MPEG-2 4:2:2P@ML data stream employing Intra-frame (I-frame) compressed video encoding. SMPTE 356M provides for recording at 30, 40 and 50 Mb/s for the highest quality Standard Definition video performance and multi-generation editing.

The second SMPTE D-10 standard is SMPTE 365M. This describes all aspects of the physical recording within a tape-based recorder. It contains details of the recorded data tracks on tape and the dimensions of the cassette. MPEG IMX camcorders, studio recorders and players conform to the two D-10 standards.

Compatibility with Betacam, Betacam SP, Betacam SX and Digital Betacam

MPEG IMX maintains compatibility with current analogue and digital systems. This compatibility provides a logical, cost-effective migration path to a combined AV/IT operation.

Metadata Enabled

Rapid access to content is critical when producing, repurposing and distributing content across multiple platforms. SMPTE has standardised the Unique Material Identifier (UMID) to radically improve the searching for and access to material. The UMID provides a unique label for each item of video and audio and can be tracked throughout the production chain. The UMID can link video and audio material on tape or disk to production notes, scripts and viewer information held within an external database. This fully integrates all aspects of content production.

Eight Channels of Digital Audio

Selected devices within the MPEG IMX product line-up can record and play back eight channels of 48kHz digital audio at 16-bit resolution. MPEG IMX studio recorders and players can also be switched to four channel operation at 24-bit 48kHz via a user selectable set-up menu.

MPEG IMX Recording Format

GENERAL

Tape width	12.65 mm (½-inch)
Tape material	Metal Particle tape
Recording/	Max. 184 (525) / 220 (625)
Playback time	with L cassette
Tape speed	64.467 (525) / 53.776 (625) mm/s
Track pitch	21.7 μm
Tracks per frame	8 tracks/frame
Longitudinal tracks	Time code/Control
Playback compatibility	
MSW-M2000P/1 +	Betacam, Betacam SP, Betacam SX,
MSW-M2100P/1	Digital Betacam
MSW-A2000P/1	Betacam, Betacam SP, Betacam SX
MSW-2000	Betacam SX

VIDEO

Compression	MPEG-2 4:2:2P@ML, Intra frame coding (ISO/IEC 13818-2000)
Video bit rate	50 Mb/s
Active lines per frame	512 (525)/608 (625)
Sampling frequency	Y: 13.5 MHz, R-Y/B-Y: 6.75 MHz
Quantization	8-bits/sample
Error correction	Reed-Solomon

AUDIO

Compression	None
Sampling frequency	48 kHz
Quantization	16 or 24-bits/sample (selectable)
Channels	8 or 4
Data recording capability	Yes
Error correction	Reed-Solomon

File-Based Operation using MXF

There is a continuing shift from traditional step-by-step programme production to workgroup-based production across computer networks. The increased speed of networks and the availability of lower cost IT components continue to accelerate the rate of this change. But workgroup operation can only succeed when standardised formats exist for the file-based exchange of video and audio material. The Professional MPEG Forum recognised this need and worked to create MXF (the Material Exchange Format).

MXF is a file exchange mechanism for the movement of video, audio and metadata across a network. Standardised by SMPTE, MXF has been developed for storage on a variety of media and operates independently of any specific network or operating system. MXF is compression independent and can carry many different content types as its payload, including MPEG IMX, HDCAM, DVCAM, DVCPRO and uncompressed video.

MXF is an open, widely supported file format used in products such as the MPEG IMX-based e-VTR where traditional stream-based AV production can co-exist within file-based operations.

Rapid Access to Recorded Material using the Tele-File System

Tele-File is a system for identifying the location of video and audio content on a cassette. The system is based upon the Tele-File cassette label. This label has a built-in memory chip and can be attached to any Betacam-family cassette. Information, such as the IN point, the OUT point and the NAME of a video clip, can be written to and read from a Tele-File label.

MPEG IMX studio recorders, players, camcorders and the revolutionary e-VTR have a Tele-File reader/writer built in to the cassette compartment. This allows a networked e-VTR to rapidly identify and cue up to video files recorded on the tape. With Tele-File, a controlling software application can look at the files in the same way as if it were looking at a list of files on a computer hard disk. This significantly reduces the time required to access material, leading to greater operation efficiency and improved workflow.

MPEG IMX Advantages

- MPEG-2 4:2:2P@ML at 50 Mb/s
- Superb picture quality
- 608 (625/50) lines per frame
- 220 minutes recording with L-cassette
- 8 channels of digital audio
- Frame accurate digital editing
- Lower tape running costs
- Lower maintenance costs
- Powerful editing features including pre-read
- Fully networkable for IP operation
- Metadata-enabled
- Based on industry standards throughout
- Rugged and reliable

■ Camcorder

MSW-970P

MPEG IMX CAMCORDER

The **MSW-970P is the latest addition to the MPEG IMX line-up.** This second generation camcorder combines Power HAD™ EX CCD performance with high precision 14 bit A/D conversion to deliver reduced noise and smear and excellent sensitivity. Progressive recording at 25 frames per second is provided along with features such as slow shutter mode, interval recording and picture cache operation. Use of the latest technology has reduced size, power consumption and acoustic noise.

FEATURES

- 3-chip 2/3-inch Power HAD EX™ CCDs
- Superb MPEG IMX picture quality
- Switchable between 50i and 25P, and 4:3 and 16:9 modes
- Long recording time of up to 71 minutes on a single cassette
- 14 bit A/D conversion
- High sensitivity of F11 at 2000 lux
- Low smear level of –145dB (typical)
- Excellent signal-to-noise ratio of 63dB
- Turbo gain up to +48dB
- TruEye™ processing for improved reproduction of natural colours
- Slow shutter mode for shooting in extremely low-light conditions
- Selectable gamma table including film-like gamma
- Auto Trace White (ATW) system
- Triple skin tone detail control
- Multi-matrix feature
- Dial in colour temperature
- Dual optical filters
- Picture cache for capturing the (up to) 8 seconds of material before the record button is pressed (MSDW-903 option required)
- SDI output (CBK-SD01 option required)
- Composite analogue input (MSDW-904 option required)
- 4 channels of 16 or 20 bit digital audio*
- Stereo audio output
- Slot for WRR-855 series wireless microphone receiver
- Memory Stick slot for storage and recall of set-up parameters
- Remote control using optional RM-B150 or RM-B750 controllers
- Battery remaining display in viewfinder
- Rugged and ergonomic design
- Essence Mark recording for rapid cue up during editing
- UMID (Unique Material Identifier) recording for picture cataloguing and searching

  * The MPEG IMX format supports audio recording of 8 channels at 16 bit resolution. The MSW-970P can record channels 1 to 4. An MPEG IMX studio VTR can be used to insert the additional channels 5 to 8.

Optional Accessories

CBK-SD01
SDI Output Board

MSDW-903
Picture Cache Board

MSDW-904
Analogue Composite Input Board

BKW-401
Viewfinder Rotation bracket

RM-B150
Remote Control Unit

RM-B750
Remote Control Unit

AC-DN10
AC Adapter

AC-DN2B
AC Adapter

BP-GL65/GL95
Lithium Ion Battery Pack

BC-L70
Battery Charger
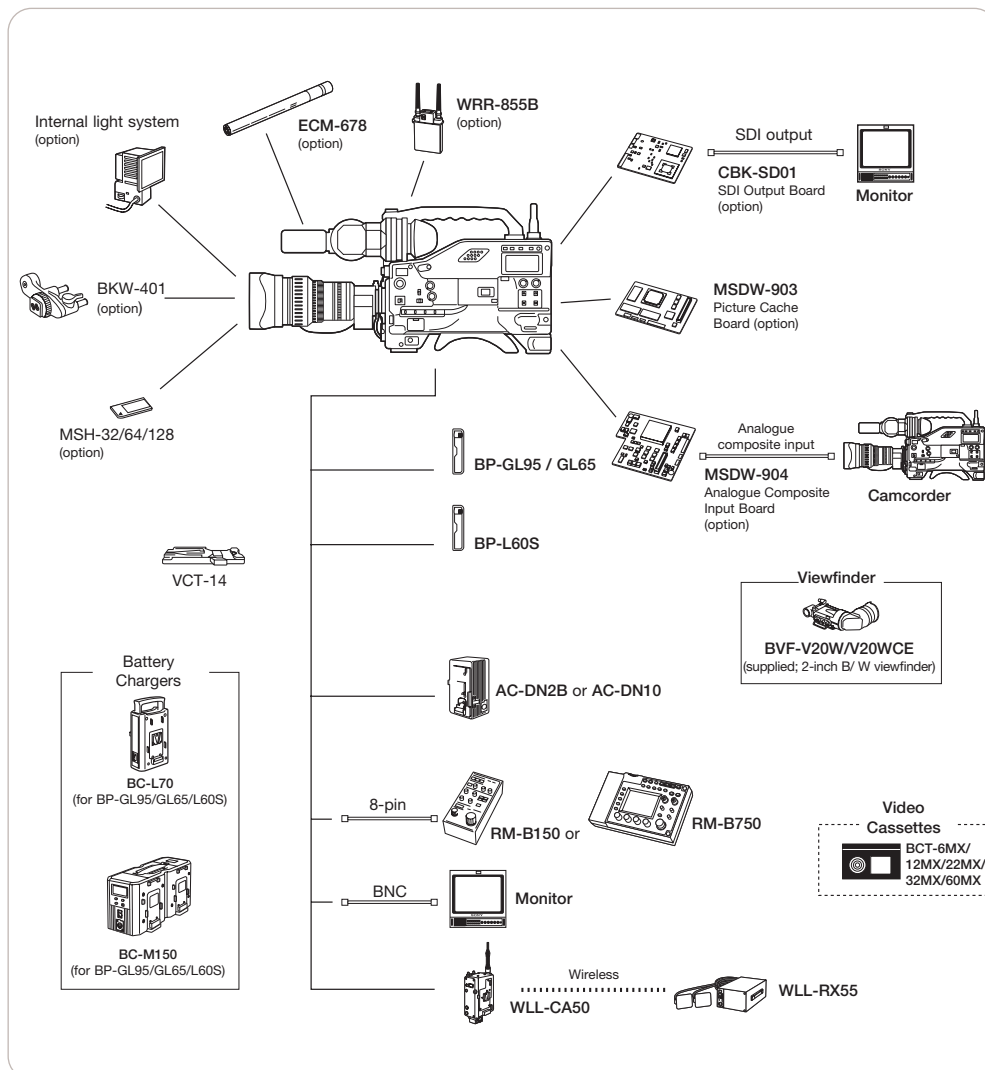
BC-M150
Battery Charger

VCT-14
Tripod Adapter

BCT-6MX/ 12MX/22MX/ 32MX/60MX
MPEG IMX Tapes

MSH-32/64/128
Memory Stick media

System configuration

Internal light system (option)

ECM-678 (option)

WRR-855B (option)

SDI output

CBK-SD01
SDI Output Board (option)

Monitor

BKW-401 (option)

MSDW-903
Picture Cache Board (option)

MSH-32/64/128 (option)

Analogue composite input

MSDW-904
Analogue Composite Input Board (option)

Camcorder

BP-GL95 / GL65

BP-L60S

VCT-14

Viewfinder

BVF-V20W/V20WCE
(supplied; 2-inch B/ W viewfinder)

Battery Chargers

BC-L70
(for BP-GL95/GL65/L60S)

BC-M150
(for BP-GL95/GL65/L60S)

AC-DN2B or AC-DN10

8-pin

RM-B150 or

RM-B750

BNC

Monitor

Video Cassettes
BCT-6MX/ 12MX/22MX/ 32MX/60MX

Wireless

WLL-CA50

WLL-RX55

WRR-855B
Wireless Receiver
(Shown here with a BTA-801 Camera adapter for rear Mounting to camcorder)

WRR-862B
Wireless Receiver

WLL-CA50
Wireless Camera Transmitter

WLL-RX55
Wireless Camera Receiver

ECM-670/672/678
Shotgun-type Electret Condenser Microphones

Not pictured here:

1-547-341-12 Fog-proof Filter
A-8262-537-A Viewfinder Eye-piece (high magnification)
A-8262-538-A Viewfinder Eye-piece (low magnification)
A-8267-737-A Viewfinder Eye-piece (standard magnification with special compensation for aberrations)
A-8314-798-A Viewfinder Eye-Piece (high performance, x3)
X-3608-271-1 Standard Viewfinder Lens
A-8278-057-A Mounting Bracket for WRR-862B
LC-DN7 Hard Carrying Case

Studio Recorders & Player

MSW-M2000P/1

MPEG IMX DIGITAL VIDEOCASSETTE RECORDER

Records: **MPEG IMX**

Replays: **BETACAM SX** **MPEG IMX** **Digital BETACAM** **BETACAM** **BETACAM SP**

The **MSW-M2000P/1 MPEG IMX** studio recorder combines the high picture quality of 50 Mb/s MPEG-2 intra-frame data compression with a rugged and reliable 1⁄2-inch tape transport. Designed for programmes such as drama, sports, arts, news and natural history, the MSW-M2000P/1 provides eight channels of uncompressed digital audio, making it ideal for multi-lingual and multi-channel operation. The MSW-M2000P/1 can be used for traditional linear editing or for broadcast playout in a Flexicart™ or Library Management System™ (LMS). In addition to compatible replay of Betacam SX cassettes, the MSW-M2000P/1 can also replay Betacam, Betacam SP and Digital Betacam tapes, providing an elegant migration of existing systems to the open world of MPEG-2.

MSW-M2000P/1

- 50 Mb/s MPEG-2 4:2:2P@ML for excellent picture quality
- User selectable 48 kHz digital audio (8 channels 16-bit, or 4 channels 24-bit)
- Long record and playback time: 220 minutes using an L cassette and 71 minutes using an S cassette
- Betacam, Betacam SP, Betacam SX and Digital Betacam playback
- ± 0 frame accurate insert/assemble editing
- Pre-read editing capability
- Broadcast quality variable speed playback at -1 to x3 speed (-1 to x2 with Betacam SX cassettes)
- High-speed picture search at ± 78 times normal play speed with MPEG IMX cassettes
- Video in/out via composite, component, SDI and SDTI-CP interfaces
- Audio in/out via analogue, AES/EBU, SDI and SDTI-CP interfaces
- 625/50 and 525/60 switchable operation
- DMC (Dynamic Motion Control) function
- Shot Mark handling
- Double-speed transfer from MPEG IMX cassettes to D-10-compliant editors and servers via SDTI-CP, or the optional 1000Base-T interface
- Memory Stick slot for storage of operational set-up menus and download of software
- Upgradeable to e-VTR and MXF operation using optional BKMW-E3000
- Tele-File function
- UMID Metadata recording and playback

MSW-M2000P/E

The MSW-M2000P/1 is also available with e-VTR functionality built-in. The model name is MSW-M2000P/E.

MSW-A2000P/1

MPEG IMX DIGITAL VIDEOCASSETTE RECORDER

Records: **MPEG IMX**

Replays: **BETACAM SX** **MPEG IMX** **BETACAM** **BETACAM SP**

The **MSW-A2000P/1 MPEG IMX** studio recorder provides all the features of the MSW-M2000P/1 but without Digital Betacam playback. Like the MSW-M2000P/1, the MSW-A2000P/1 can be equipped with e-VTR network functionality through the addition of the BKMW-E3000 Network Interface option. Operational set-up parameters can be permanently stored on Memory Stick via the Memory Stick port provided.

MSW-A2000P/1

- 50 Mb/s MPEG-2 4:2:2P@ML for excellent picture quality
- User selectable 48 kHz digital audio (8 channels 16-bit, or 4 channels 24-bit)
- Long record and playback time: 220 minutes using an L cassette and 71 minutes using an S cassette
- Betacam, Betacam SP and Betacam SX playback
- ± 0 frame accurate insert/assemble editing
- Pre-read editing capability
- Broadcast quality variable speed playback at -1 to x3 speed (-1 to x2 with Betacam SX cassettes)
- High-speed picture search at ± 78 times normal play speed with MPEG IMX cassettes
- Video in/out via composite, component, SDI and SDTI-CP interfaces
- Audio in/out via analogue, AES/EBU, SDI and SDTI-CP interfaces
- 625/50 and 525/60 switchable operation
- DMC (Dynamic Motion Control) function
- Shot Mark handling
- Double-speed transfer from MPEG IMX cassettes to D-10-compliant editors and servers via SDTI-CP, or the optional 1000Base-T interface
- Memory Stick slot for storage of operational set-up menus and download of software
- Upgradeable to e-VTR and MXF operation using optional BKMW-E3000
- Tele-File function
- UMID Metadata recording and playback

MSW-A2000P/E

The MSW-A2000P/1 is also available with e-VTR functionality built-in. The model name is MSW-A2000P/E.

MSW-2000

MPEG IMX DIGITAL VIDEOCASSETTE RECORDER

Records: MPEG IMX

Replays: BETACAM SX MPEG IMX

For users who do not require playback of analogue Betacam, Betacam SP or Digital Betacam cassettes, Sony has introduced the **MSW-2000**. This 525/60 and 625/50 switchable recorder offers a lower-cost entry to the world of MPEG IMX recording and playback.

MSW-2000

- 50 Mb/s MPEG-2 4:2:2P@ML for excellent picture quality
- User-selectable 48 kHz digital audio (8 channels 16-bit, or 4 channels 24-bit)
- Long record and playback time: 220 minutes using an L cassette and 71 minutes using an S cassette
- Betacam SX playback
- ± 0 frame accurate insert/assemble editing
- Pre-read editing capability
- Broadcast quality variable speed playback at -1 to x3 speed (-1 to x2 with Betacam SX cassettes)
- High-speed picture search at ± 78 times normal play speed with MPEG IMX cassettes
- Video in/out via composite, component, SDI and SDTI-CP interfaces
- Audio in/out via analogue, AES/EBU, SDI and SDTI-CP interfaces
- 625/50 and 525/60 switchable operation
- DMC (Dynamic Motion Control) function
- Shot Mark handling
- Memory Stick slot for storage of operational set-up menus and download of software
- Upgradeable to e-VTR and MXF operation using optional BKMW-E3000
- Tele-File function
- UMID Metadata recording and playback

MSW-2000/E + MSW-M2100P/E

The MSW-2000 and MSW-M2100P/1 are also available with e-VTR functionality built-in. The model names are MSW-2000/E and MSW-M2100P/E.

MSW-M2100P/1

MPEG IMX DIGITAL VIDEOCASSETTE PLAYER

Replays: BETACAM SX MPEG IMX Digital BETACAM BETACAM BETACAM SP

The **MSW-M2100P/1** MPEG IMX studio player provides all the features of the MSW-M2000P/1 but in a player-only model. Broadcast-quality variable speed and picture search operation, along with 525/625 switchability and double-speed playback of MPEG IMX cassettes are all standard features.

MSW-M2100P/1

- 50 Mb/s MPEG-2 4:2:2P@ML playback for excellent picture quality
- User selectable 48 kHz digital audio (8 channels 16-bit, or 4 channels 24-bit)
- Long playback time: 220 minutes using an L cassette and 71 minutes using an S cassette
- Betacam, Betacam SP, Betacam SX, MPEG IMX and Digital Betacam playback
- ±0 frame accurate operation
- Broadcast quality variable speed playback at -1 to x3 speed (-1 to x2 with Betacam SX cassettes)
- High-speed picture search at ±78 times normal play speed with MPEG IMX cassettes
- Video out via composite, component, SDI and SDTI-CP interfaces
- Audio out via analogue, AES/EBU, SDI and SDTI-CP interfaces
- 625/50 and 525/60 switchable operation
- DMC (Dynamic Motion Control) function
- Shot Mark handling
- Double-speed transfer from MPEG IMX cassettes to D-10-compliant editors and servers via SDTI-CP, or the optional 1000Base-T interface
- Memory Stick slot for storage of operational set-up menus and download of software
- Upgradeable to e-VTR and MXF operation using optional BKMW-E3000
- Tele-File function
- UMID Metadata playback

Options

BKMW-E3000

e-VTR Network Interface Option

MPEG IMX studio recorders and players can now be equipped with e-VTR functionality. The optional plug-in Network Interface provides an elegant integration of tape and file-based operation for combined AV/IT production. The BKMW-E3000 adds network connectivity, an IP address and the ability to exchange video, audio and metadata within MXF files. Furthermore, an e-VTR can create MXF files from all Betacam, Betacam SP, Betacam SX, MPEG IMX and Digital Betacam tapes supplied by Sony since 1982. These files can be moved around a Local Area Network (LAN) using simple drag and drop operation. With the BKMW-E3000, MPEG IMX VTRs can be integrated into a standard 1000Base-T environment at the user's own pace, bringing new benefits to workflow through the combination of computer-based and tape-based operations.

FEATURES

- Adds IEEE 802.3ab 1000Base-T interface and IP address to MPEG IMX VTRs
- MXF file transfer with MPEG IMX D-10 data payload
- Reliable file transfer using TCP/IP and FTP
- SNMP-enabled for remote monitoring
- Low resolution capability for material selection prior to file transfer using same browser format as XDCAM
- MXF output from Betacam, Betacam SP, Betacam SX, MPEG IMX and Digital Betacam cassettes from MSW-M2000P/1 and MSW-M2100P/1
- e-Manager software application allows simple MXF file creation and movement

BKMW-101

Studio VTR Control Panel

BKMW-102

Control Panel Case

BKMW-103

Control Panel Extension Kit

The BKMW-101 provides additional control of the MPEG IMX studio recorders and players from a remote location. It is used with the BKMW-102 Control Panel Case and the BKMW-103 Control Panel Extension kit. A switch on the front of the recorder/player allows control to be selected between the remote control panel and the control panel supplied with the recorder/player. The BKMW-102 and BKMW-103 can also be used to extend the supplied front panel of the recorder or player. BKMW-103 includes a blanking panel which can be fixed to the front of the recorder/player in place of the original control panel.

BKMW-104

HD Up-Converter Board

The BKMW-104 can be installed into MPEG IMX VTRs to provide a High Definition output via HD-SDI. The BKMW-104 converts 625/50 material to 1080/50i, and converts 525/60 material to 1080/59.94i. Please note that the BKMW-104 cannot be installed to a VTR which has the BKMW-E3000 e-VTR Network Interface Option fitted and vice versa.

MLB-1M-100

Tele-File Labels (Packs of 100. Cassette not included.)

RMM-131

Rack Mount Kit

MPEG IMX Videocassettes

BCT-6MX (7) / 12MX (14) / 22MX (26) / 32MX (38) / 60MX (71) (small) *
BCT-64MXL (76) / 94MXL (112) / 124MXL (148) / 184MXL (220) (large) *

* 625 record duration shown in brackets

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Services from Sony: working with you, working for you.
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• Compact Players

J-30 & J-30/SDI
COMPACT PLAYERS

Digital BETACAM
MPEG IMX
BETACAM SX
BETACAM SP
BETACAM

The **J-30** and **J-30/SDI** are the smallest players of Betacam family cassettes. The design concept of the J-Series was for affordable, compact office viewers to be used by producers, journalists and production staff. The J-30 and J-30/SDI can replay Betacam, Betacam SP, Betacam SX, MPEG IMX and Digital Betacam S-cassettes and L-cassettes. They also have all the features required for viewing and logging, and – although not designed for linear editing applications or on-air use – are ideal for source feeding to servers or non-linear editing systems. The J-30 provides composite and component analogue video outputs, while the J-30/SDI has composite analogue and SDI outputs. Both models have an i.LINK interface for feeding material to DV-based editing applications and are supplied with an infra-red remote controller. The J-30 and J-30/SDI also have a jog/shuttle dial, 525/625 versatility, simple remote control via RS-422A and audio meters – all packed into their compact size.

- Extremely compact: 307 x 100 x 397 mm
  (12 ⅛ x 4 x 15 ½ inches) in size and just 8 kg in weight
- i.LINK interface (25 Mb/s DV output, and remote control input via 6-pin IEEE-1394)
- Playback of Betacam, Betacam SP, Betacam SX, MPEG IMX and Digital Betacam cassettes
- Playback of S-cassettes and L-cassettes
- Jog/Shuttle dial with x20 maximum search speed for Digital Betacam cassettes
- Infra-red remote controller
- 525/625 switchable for international operation
- Monitor output of 2 audio channels (selectable on front panel)
- Audio meters for display of the selected 2 channels of audio
- Industry-standard RS-422A control interface for remote feeding into servers and non-linear editors

J-30 only
- Composite analogue and component analogue video outputs

J-30/SDI only
- Composite analogue and 2 SDI outputs
  (one with superimposed characters)
- Timecode output via BNC connector
- Built-in UMID (Unique Material Identifier) reader
- 4 channels of digital output via SDI
  (8 channels when replaying MPEG IMX cassettes)

■ Specifications

MSW-970P

GENERAL

Mass	Approx. 3.7 kg (8 lb 3 oz) 5.4 kg (with VF, Mic, BCT-60MX, BP-GL95) (11 lb 14 oz)
Power requirements	DC 12 V +5.0 V/-1.0 V
Power consumption	Approx. 27 W (with DC 12V power supply, REC mode with VF)
Operating temperature	0 to 40 °C (+32 °F to +104 °F)
Storage temperature	-20 to +60 °C (-4 °F to+140 °F)
Humidity	25 to 85% (relative humidity)
Continuous operating time	Approx. 180 min with BP-GL95 battery at 25°C (77°F), REC mode

SIGNAL INPUTS

Genlock video	BNC type x1, 1.0 Vp-p, 75 Ω
Time code input	BNC type x1, 0.5 to 18 Vp-p, 10 kΩ
Video outputs SDI	BNC type x1, 0.8 Vp-p, 75 Ω (with the CBK-SD01)
Audio input (CH-1/2)	XLR-3-31 type x2, -60/-50/+4 dBu selectable, high impedance, balanced (0 dBu = 0.775 Vrms.)
Mic input	XLR-3-31 type x1, -60/-50 dBu

SIGNAL OUTPUTS

Video output (Analogue composite)	BNC type x1, 1.0 Vp-p, 75 Ω
Video test output	BNC type x1, 1.0 Vp-p, 75 Ω
Time code output	BNC type x1, 1.0 Vp-p, 75 Ω
Earphone	Minijack x2
Audio output (CH-1/CH-2)	XLR-5-pin male (stereo)

OTHERS

Lens	12-pin
VF	20-pin
Remote	8-pin
Light	2-pin, DC 12 V, max. 50 W
DC input	XLR-4-pin (male, DC 11 to 17V)
DC output	4-pin (for wireless microphone receiver), DC 12 V (max. 0.1 A)
Battery terminal	5-pin
Wireless receiver input	D-Sub 15-pin

VTR SECTION

Recording format	Video	MPEG IMX (50/40/30 Mb/s)
	Audio	4 ch/16 bits/48 kHz, 4 ch/20 bits/48 kHz
Tape speed		53.776 mm/s
Playback/Recording time		Max. 71 min. with BCT-60MX cassette
Fast forward time		Approx. 5 min. with BCT-60MX
Rewind time		Approx. 5 min. with BCT-60MX
Recommended tape		Sony MPEG IMX S cassette (BCT-6MX/12MX/22MX/32MX/60MX)

DIGITAL VIDEO PERFORMANCE

Sampling frequency	Y: 13.5 MHz, R-Y/B-Y: 6.75 MHz
Quantization	8 bits/sample
K-factor (2T pulse)	Less than 1%
Y/R-Y/B-Y delay	Less than 15 ns

DIGITAL AUDIO PERFORMANCE*

Sampling frequency	48 kHz (synchronised with video)
Quantization	20/16bits/ sample (selectable)
Frequency response	20 Hz to 20 kHz, +0.5 dB/-1.0 dB
Dynamic range	More than 85 dB (emphasis ON)
Distortion (at 1 kHz, emphasis ON, reference level)	Less than 0.08%
Cross talk (at 1 kHz, reference level)	Less than -70 dB
Wow & flutter	Below measurable limit
Head room	20 dB (ex-factory setting)

* The specifications given above were measured via CA-701/702 Camcorder Adapter or MSDW-902 SDI output board.

CAMERA SECTION

Pickup device	3-chip 2/3-inch type Power HAD EX CCD
Aspect ratio	16:9/4:3 switchable
Total picture elements	1038 (H) x 1188 (V)
Optical system	F1.4 prism (with quarts filter)
Built-in optical filters	1: Clear, 2: 1/4ND, 3: 1/16ND, 4: 1/64ND, A: CROSS, B: 3200K, C: 4300K, D: 6300K
Lens mount	2/3 inch type Sony bayonet mount
Scan format	625/50i, 625/25p
Sensitivity (2000 lx, 89.9% reflectance)	F11 (typical) (2000 lx, 89.9% reflectance)
Minimum illumination	0.008 lx (F1.4 lens, +48 dB gain, with slow shutter mode at 16-frame accumulation)
Smear level	-145 dB (typical)
Video S/N ratio	63 dB (typical)
Vertical resolution	480 TV lines (with EVS) and 530 TV lines (without EVS) in 625/50i mode 575 TV lines in 625/25p mode
Shutter speed	1/60, 1/125, 1/250, 1/500, 1/1000, 1/2000 s at 625/50i mode 1/33, 1/50, 1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 s at 625/25p mode
ECS	50 to 6000 Hz at 625/50i mode, 25 to 6000 Hz at 625/25p mode
Slow shutter	1/25, 1/12.5, 1/8.3, 1/6.3, 1/5, 1/4.2, 1/3.6, 1/3.1, 1/1.6 s (1 to 8, 16 frames)
Gain selection	-3, 0, 3, 6, 9, 12, 18, 24, 30, 36, 42, 48 dB (for GAIN LOW, GAIN MID, GAIN HIGH and GAIN TURBO positions)
Registration	0.05% (all zones without lens)
Warm-up time	2 s
Modulation depth at 5MHz	70% (16:9, typical) /55% (4:3, typical)

VIEWFINDER

CRT	2.0-inch type monochrome
Controls	BRIGHT, CONTRAST, PEAKING controls, TALLY, ZEBRA, DISPLAY switches
Horizontal resolution	450 TV lines (16:9)
Microphone	Electret condenser microphone (Ultra-directional) (Detachable)

SUPPLIED ACCESSORIES

|	
	Operation manual (x1), Viewfinder (x1), Lens cap (x1), Shoulder belt (x1), Monaural microphone (x1), XLR connector cap (x4)

MSW-M2000P/1 MSW-M2100P/1 MSW-A2000P/1 MSW-2000

GENERAL

Power requirements	AC 100 to 240 V, 50/60 Hz			
Power consumption	2.1A (210 W) / AC 240 V	1.9A (190 W) / AC 240 V	2A (200 W) / AC 240 V	1.8A (180 W) / AC 240 V
Operating temperature	+5 to +40 °C (+41 to +104 °F)			
Storage temperature	-20 to +60 °C (-4 to +140 °F)			
Humidity	20 % to 90 % (relative humidity)			
Mass	23.5 kg (51 lb 12 oz)	23.0 kg (50 lb 11 oz)	23.0 kg (50 lb 11 oz)	22.0 kg (48 lb 8 oz)
Dimensions (W x H x D)	427 x 194 x 544 mm (16 ⅞ x 7 ¾ x 21 ½ inches)			

Tape speed			
Digital Betacam	96.7 (525 and 625) mm/s		–
MPEG IMX™	64.467 (525)/53.776 (625) mm/s		
Betacam SX	59.515 (525)/59.575 (625) mm/s		
Betacam/Betacam SP	118.6 (525)/101.51 (625) mm/s		–

Digital playback time			
Digital Betacam	Max. 124 (525 and 625) min with BCT-D124L cassette		–
MPEG IMX™	Max. 184 (525)/220 (625) min with BCT-184MXL cassette		
Betacam SX	Max. 194 (525 and 625) min with BCT-194SXLA		
Betacam/Betacam SP	Max. 90 (525)/108 (625) min with BCT-90MLA		
Fast forward/rewind time	Approx. 3 min with BCT-184MXL cassette		

Search speed range			
Digital Betacam	±50 times normal playback speed		–
MPEG IMX™	±78 times normal playback speed		
Betacam SX	±78 times normal playback speed		
Betacam/Betacam SP	±35 (525)/±42 (625) times normal playback speed		–
Servo lock time	0.5 (NTSC)/0.7 (PAL) s or less (from standby on)		
Load/unload time	6 s or less		

INPUTS/OUTPUTS

Analogue composite input	BNC (x 2 including one throughout), 1.0 Vp-p, 75 Ω , sync negative	–		BNC (x 2 including one throughout), 1.0 Vp-p, 75 Ω , sync negative
Analogue composite output	BNC (x 3), 1.0 Vp-p, 75 Ω , sync negative			
Analogue component input	BNC (x 3), 1.0 Vp-p, 75 Ω , sync negative, R-Y/B-Y: 0.7 Vp-p, 75 Ω	–		BNC (x 3), 1.0 Vp-p, 75 Ω , sync negative, R-Y/B-Y: 0.7 Vp-p, 75 Ω
Analogue component output	BNC (x 3), 1.0 Vp-p, 75 Ω , sync negative, R-Y/B-Y: 0.7 Vp-p, 75 Ω			
SDI input	BNC (x 2 including one active through out), SMPTE 259M (ITU-R BT.656-3), 270 Mbit/s	–		BNC (x2, including one active through out), SMPTE 259M (ITU-R BT.656-3), 270 Mbit/s
SDI output	BNC (x 3, including one character out), SMPTE 259M (ITU-R BT.656-3), 270 Mbit/s			
SDTI-CP input	BNC (x1), SMPTE, 326M (SDTI-CP)	–		BNC (x1), SMPTE, 326M (SDTI-CP)
SDTI-CP output	BNC (x2), SMPTE, 326M (SDTI-CP)			
Analogue audio input	XLR (x4)	–		XLR (x4)
Analogue audio output	XLR (x 4)			
Digital audio input (CH 1/2, 3/4, 5/6, 7/8), AES/EBU	BNC (x4), default 48 kHz (32 to 48 kHz with Sample rate converter)	–		BNC (x4), default 48 kHz (32 to 48 kHz with Sample rate converter)
Digital audio output (CH 1/2, 3/4, 5/6, 7/8), AES/EBU	BNC (x 4), 48 kHz fixed			
Remote control Remote				
RS-422A	D-sub 9-pin (x2), Sony 9-pin remote interface			
RS-232C (ISR*)	D-sub 9-pin (x 1), RS-232C interface			
Parallel remote	D-sub 50-pin (x1), female			
Video control (1)	D-sub 15-pin (x1), female			
Control panel	Circular connector 10-pin, female			
Reference input	BNC (x2) (VBS or VS) (including one through out)			
Time code input	XLR (x 1), female		XLR (x1), female	
Time code output	XLR (x1), male			
Memory card insertion slot	PCMCIA (x1)			–
Memory Stick insertion slot	Memory Stick (x1)			
Monitor output L/R	XLR (x2) (channel selectable)			

e-VTR (BKMW-E3000)
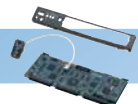
GENERAL

Power requirements	+2.5 V DC: 3.0 A, +3.4 V DC: 3.3 A, +6.0 V DC: 1.0 A (Supplied from MSW-2000P Series VTR)
Operating temperature	+5 to +40 °C (+41 to +104 °F)
Storage temperature	-20 to +60 °C (-4 to +140 °F)
Operating humidity	25 to 80 % (no condensation)
Dimensions Board (W x H)	355 x 146 mm (14 ⅜ x 5 ⅞ inches)
Front Panel (W x H x D)	430 x 70 x 45 mm (17 ⅜ x 2 ⅞ x 1 ⅞ inches)
Connector Panel (W x H)	72 x 42 mm (2 ⅞ x 1 ⅜ inches)
Mass Board	Approx. 380 g (13.4 oz)
Front Panel	Approx. 130 g (4.6 oz)
Connector Panel	Approx. 50 g (1.8 oz)
Interface	Network Interface, RJ-45, Gigabit Ethernet (1000Base-T)

SYSTEM REQUIREMENTS FOR THE SUPPLIED e-VTR APPLICATION SOFTWARE

PC	IBM PC/AT® -Compatible machine
Operating System	Microsoft Windows 2000, XP (with DirectX 8.1b or higher)
Memory Capacity	256 MB RAM minimum
CPU	1-GHz Intel® Pentium® processor or faster
Display	XGA 1024 x 768 or higher with more than 16-bit High Colour
Sound	MCI Device & Driver, Microphone, Speaker
Interface	Fast Ethernet or GbE is recommended.
Hard Disk Drive	5 MB or more

Notes: The BKMW-E3000 can be installed into any MPEG IMX VTR that supports the Tele-File™ function.

MSW-M2000P/1 MSW-M2100P/1 MSW-A2000P/1 MSW-2000

PROCESSOR ADJUSTMENT RANGE

Video level	±3 dB/ - ∞to +3 dB selectable
Chroma level	±3 dB/ - ∞to +3 dB selectable
Black level	±210 mV
Chroma phase	±30°
System sync phase	±15 μs
System SC phase	±200 ns
Y/C delay	±100 ns (Betacam/Betacam SP playback only)	–
Composite input level	±3 dB	–	±3 dB

DIGITAL VIDEO PERFORMANCE

Sampling frequency	Y: 13.5 MHz R-Y/B-Y: 6.75 MHz
Quantization	8 bits/sample
Error correction	Reed-Solomon code
Analogue component output	Bandwidth: Y: 0 to 5.75 MHz +0.5/-2.0 dB, R-Y/B-Y: 0 to 2.75 MHz +0.5/-2.0 dB S/N ratio: 56 dB or more K-factor (2T pulse): 1 % or less
Analogue component input to Analogue component output	A/D and D/A quantization: 10 bits/sample Bandwidth: Y: 0 to 5.75 MHz +0.5/-2.0 dB, R-Y/B-Y: 0 to 2.75 MHz +0.5/-2.0 dB S/N ratio: 52 dB or more K-factor (2T pulse): 1 % or less LF non-linearity: 3.0 % or less	A/D and D/A quantization: 10 bits/sample Bandwidth: Y: 0 to 5.75 MHz +0.5/-2.0 dB, R-Y/B-Y: 0 to 2.75 MHz +0.5/-2.0 dB S/N ratio: 52 dB or more K-factor (2T pulse): 1 % or less LF non-linearity: 3.0 % or less
Analogue composite input to Analogue composite output	Bandwidth: 0 to 5.75 MHz +0.5/-2.0 dB S/N ratio: 53 dB or more Differential gain: 2 % or less Differential phase: 2°or less Y/C delay: 20 ns or less	Bandwidth: 0 to 5.75 MHz +0.5/-2.0 dB S/N ratio: 53 dB or more Differential gain: 2 % or less Differential phase: 2°or less Y/C delay: 20 ns or less K-factor (2T pulse): 1 % or less

DIGITAL AUDIO PERFORMANCE

Sampling frequency	48 kHz (synchronised with video)
Quantization	16 or 24 bits/sample (selectable)
Analogue input to output A/D and D/A quantization	24 bits/sample
Frequency response (0 dB at 1 kHz)	20 Hz to 20 kHz +0.5 dB/-1.0 dB
Dynamic range (at 1 kHz, emphasis ON)	More than 90 dB (16 bits)/ 95dB (24 bits)
Distortion (at 1 kHz, emphasis ON, reference level)	Less than 0.05%
Cross talk (at 1 kHz, between any two channels)	Less than -80 dB
Wow & flutter	Below measurable level
Head room	20 dB (18 dB selectable)
Emphasis (ON/OFF selectable in, REC mode)	T1=50 μs, T2=15 μs

SUPPLIED ACCESSORIES

	PSW 4 x 16 Rack mount screws x 4, Operation manual x 1, Installation manual x 1

* ISR: Interactive Status Reporting

RECOMMENDED WIRELESS SYSTEMS: WL-800 SERIES

	WRR-862B Receiver	WRR-855B Receiver	WRT-8B Transmitter*	ECM-88BC Lavalier Mic
UHF operating frequency	Dependent on version / region	Dependent on version / region	Dependent on version / region	no
Frequency response	40 Hz – 18 kHz	100 Hz – 15 kHz	40Hz – 20 kHz	40Hz – 20 kHz
Signal to noise	>60 dB A-weighted	>60 dB A-weighted	60 dB or more	
RF Power output	N/A		10/50 mW Switchable	
Current consumption	230 mA	200 mA	6 hours @ 50 mW	
Battery life	5 hours		13 hours @ 10 mW	
Max SPL	N/A			120 dB
Weight	400 g	280 g	140 g incl batteries	1.5 g Capsule
Dimensions W x H x D (mm)	89 x 120 x 29.5	88 x 118 x 31	63 x 83 x 17	3.5 x 3.5 x 12.5 Capsule
Mounting/adaptor brackets required	A8278-057A	CA-WR855, BTA-801 or A8278-057A		
Cable Length	N/A			2.5 m

* Or use WRT-847B Handheld Transmitter with either CU-F780, CU-G780, CU-E700, CU-E672 or CU-F117 Capsule

J-30 & J-30/SDI

GENERAL

Power requirements	AC 100 V to 240 V, 50/60 Hz
Power consumption	55 W
Operating temperature	+5 to +40 °C (+41 to +104 °F)
Storage temperature	-20 to +60 °C (-4 to +140 °F)
Humidity	25% to 80% (relative humidity)
Mass	8.2 kg (18 lb 1 oz)
Dimensions (W x H x D)	307 x 100 x 397 mm (12 ⅛ x 4 x 15 ¾ inches)
Tape Speed	
Digital Betacam	96.7 mm/s
MPEG IMX	64.467 mm/s (525 mode), 53.776 mm/s (625 mode)
Betacam SX	59.515 mm/s (525 mode), 59.575 mm/s (625 mode)
Betacam/Betacam SP	118.6 mm/s (525 mode), 101.5 mm/s (625 mode)
Playback Time	
Digital Betacam	Max. 124 min. with BCT-D124L
MPEG IMX	Max. 184 min. (525 mode)/ 220 min. (625 mode) with BCT-184MXL
Betacam SX	Max. 194 min. with BCT-194SXLA
Betacam/Betacam SP	Max. 90 min. (525 mode)/ 108 min. (625 mode) with BCT-90MLA
Fast Forward / Rewind	
Digital Betacam	Approx. 5 min. with BCT-D124L
MPEG IMX	Approx. 5 min. with BCT-184MXL
Betacam SX	Approx. 5 min. with BCT-194SXLA
Betacam/Betacam SP	Approx. 5 min. with BCT-90MLA
Search Speed Range	
Digital Betacam	±20 times normal playback speed
MPEG IMX	±32 times normal playback speed
Betacam SX	±35 times normal playback speed
Betacam/Betacam SP	±18 times (525 mode), ±20 times (625 mode) normal playback speed
Servo lock time	1.5 s or less (from standby on)
Load/unload time	9 s or less

INPUT SIGNALS

Ext. sync	BNC (x1), Frame lock

OUTPUT SIGNALS

Analogue composite output	BNC (x1), RCA Phono (x1), 1.0 Vp-p, 75 Ω
S-video output	Mini DIN 4-pin (x1),Y: 1.0 Vp-p, C.0.286 Vp-p burst, 75 Ω
Analogue component output (with J-30)	BNC (x3), Y: 1.0 Vp-p, R-Y/B-Y: 0.7 Vp-p, 75 Ω
SDI output (with J-30/SDI)	BNC (x2), SMPTE 259M, 270 Mb/s, 0.8 Vp-p, 75 Ω
i.LINK(DV) output	6-pin (x1), IEEE 1394 (with J-30) 6-pin (x1), IEEE 1394 (with J-30/SDI)
Time Code output (with J-30/SDI)	BNC(x1), 1.0Vp-p, 75 Ω, unbalanced
Monitor output L/R	RCA Phono (x 2): -10 dBu at 47 KΩ load, unbalanced, XLR (male x 2): +4 dBm, 600 load, low impedance, balanced
Headphone output	JM-60 Stereo Phone Jack, -∞to -12 dBu at 8 Ω load, unbalanced

REMOTE CONTROL

RS-422A	D-sub 9-pin (female) (x1), Sony 9-pin remote interface
RS-232C	D-sub 9-pin (male) (x1)
Wireless	SIRCS

SUPPLIED ACCESSORIES

	Operation manual (CD-ROM), Operation manual, vertical stand (x 2), Infra-red remote controller

SONY